Abstract

Title of work: Model of cerebral focal cortical ischemia and its parametrization

Work objectives: The aim of this diploma thesis was to apply modified model of focal cortical brain ischemia induced by phototrombosis and subsequently determinate its parameters.

Methods: Intravenous application of photosensitive Rose Bengal dye was followed by continual illumination of green laser beam over the left sensorimotocortex for 10 minutes. Following illumination, the dye is activated and produces singlet oxygen that damages components of endothelial cell membranes, with subsequent platelet aggregation and thrombin formation, which eventually determines the interruption of local blood flow. This approach, initially proposed by Rosenblum and El-Sabban in 1977, was later improved by Watson in 1985 in rat brain. For histological evaluation of ischemic brain damage, animals were overdosed with urethane and transcardially perfused.

Results: Histological examination of brains showed significant ischemic damage in all experimental animals. Lesion was located in left hemisphere and penetrated thought the grey matter in various extents. Size of lesion, its localization and depth has shown only a small variability in the individual groups. Noticeable differences were found right after comparing experimental groups.

Key words: phototrombosis, ischemia, rat, blood brain barriere, neurovascular unit, epilepsy